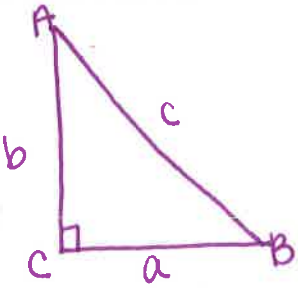
key

Trigonometry Review

Solve △ABC by using the given measurements. Round measures of sides to the nearest tenth and measures of angles to the nearest degree.



1. c = 16, a = 7

$7^2 + b^2 = 16^2$ $\boxed{b \approx 14.4}$

$\sin A = \frac{7}{16}$ $\boxed{A \approx 26°}$

$180 - (90 + 26) = \boxed{64° = B}$

2. A = 25°, c = 6

$\sin 25 = \frac{a}{6}$ $6 \sin 25 = a$ $\boxed{a \approx 2.5}$

$180 - (90 + 25) =$ $\boxed{B = 65°}$

$\cos 25 = \frac{b}{6}$ $6 \cos 25 = b$ $\boxed{b \approx 5.4}$

3. B = 45°, c = 12

$180 - (90 + 45) = 45$ $\boxed{A = 45°}$

$\sin 45 = \frac{b}{12}$ $12 \sin 45 = b$ $\boxed{b \approx 8.5}$

$\cos 45 = \frac{a}{12}$ $12 \cos 45 = a$ $\boxed{a \approx 8.5}$

4. B = 83°, b = $\sqrt{31}$

$180 - (90 + 83) = 7$ $\boxed{A = 7°}$

$\tan 83 = \frac{\sqrt{31}}{a}$ $a \tan 83 = \sqrt{31}$ $a = \frac{\sqrt{31}}{\tan 83}$ $\boxed{a \approx 0.7}$

$\sin 83 = \frac{\sqrt{31}}{c}$ $c \sin 83 = \sqrt{31}$ $\boxed{c \approx 5.6}$

5. a = 9, B = 49°

$180 - (90 + 49) = 41$ $\boxed{A = 41°}$

$\sin 41 = \frac{9}{c}$ $c \sin 41 = 9$ $\boxed{c \approx 13.7}$

$\cos 41 = \frac{b}{13.7}$ $13.7 \cos 41 = b$ $\boxed{b \approx 10.4}$

$\boxed{c \approx 4.1}$

6. Cos A = $\frac{1}{4}$, a = 4

$\cos A = \frac{1}{4}$ $A = \cos^{-1}\left(\frac{1}{4}\right)$ $\boxed{A \approx 76°}$

$180 - (90 + 76) = 14$ $\boxed{B \approx 14°}$

$\tan 14 = \frac{b}{4}$ $4 \tan 14 = b$ $\boxed{b \approx 1.0}$

Rewrite each degree measure in radians and each radian measure in degrees.

7. 255°

$255\left(\frac{\pi}{180}\right) = \boxed{\frac{17\pi}{12}}$

8. -210°

$-210\left(\frac{\pi}{180}\right) = \boxed{-\frac{7\pi}{6}}$

9. $\frac{7\pi}{4}$

$\frac{7\pi}{4}\left(\frac{180}{\pi}\right) = \boxed{315°}$

10. -4π

$-4\pi\left(\frac{180}{\pi}\right) = \boxed{-720°}$

Find one angle with positive measure and one angle with negative measure coterminal with each angle.

11. 205°

$205 + 360 = \boxed{565^\circ}$

$205 - 360 = \boxed{-155^\circ}$

13. $\frac{4\pi}{3}$

$\frac{4\pi}{3} + 2\pi = \boxed{\frac{10\pi}{3}}$

$\frac{4\pi}{3} - 2\pi = \boxed{-\frac{2\pi}{3}}$

12. -40°

$-40 + 360 = \boxed{320^\circ}$

$-40 - 360 = \boxed{-400^\circ}$

14. $\frac{-7\pi}{4}$

$-\frac{7\pi}{4} + 2\pi = \boxed{\frac{\pi}{4}}$

$-\frac{7\pi}{4} - 2\pi = \boxed{-\frac{15\pi}{4}}$

Find the exact value of the six trigonometric functions of Θ if the terminal side of Θ in standard position contains the given point.

15. P(2,5)

$x = 2 \quad y = 5 \quad r = \sqrt{2^2 + 5^2}$

$r = \sqrt{29}$

$\sin\theta = \frac{5\sqrt{29}}{29} \qquad \tan\theta = \frac{5}{2} \qquad \sec\theta = \frac{\sqrt{29}}{2}$

$\cos\theta = \frac{2\sqrt{29}}{29} \qquad \csc\theta = \frac{\sqrt{29}}{5} \qquad \cot\theta = \frac{2}{5}$

16. P(15,-8)

$x = 15 \quad y = -8 \quad r = \sqrt{15^2 + -8^2} \quad r = \sqrt{289} = 17$

$\sin\theta = \frac{-8}{17} \qquad \tan\theta = -\frac{8}{15} \qquad \sec\theta = \frac{17}{15}$

$\cos\theta = \frac{15}{17} \qquad \csc\theta = -\frac{17}{8} \qquad \cot\theta = -\frac{15}{8}$

Find the exact value of each trigonometric function.

17. cos 3π

ref. ∠ = π

$\cos\pi = -1$

-1

19. $\sin\frac{5\pi}{4}$

ref ∠ = $\frac{\pi}{4}$ $\quad$ $\frac{5\pi}{4}$ in Q3

$\sin = \frac{\sqrt{2}}{2}$ $\quad$ y is neg.

$-\frac{\sqrt{2}}{2}$

18. tan 120°

ref ∠ = 60

$\tan 60 = \sqrt{3}$

120 in Q2

$-\sqrt{3}$

20. sec (-30°)

ref ∠ = 30°

$\cos \frac{\sqrt{3}}{2}$ so $\sec = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

In Q4 so +

$\frac{2\sqrt{3}}{3}$

Determine whether each triangle has no solution, one solution, or two solutions. Then solve each triangle. Round measures of sides to the nearest tenth and measures of angles to the nearest degree.

21. a = 24, b = 36, A = 64°

$24 < 36 \sin 64$

no solution

22. A = 40°, b = 10, a = 8 2 solutions

$8 \not> 10\sin 40$

$\frac{\sin 40}{8} = \frac{\sin B}{10}$

$\sin B = .8035$

$\boxed{B \approx 54°}$

$\boxed{C \approx 86}$

$\frac{\sin 40}{8} = \frac{\sin 86}{c}$

$\boxed{c \approx 12.4}$

$180 - 54 = 126$

$\boxed{B \approx 126°}$

$180 - (126 + 40) = 14$

$\boxed{C \approx 14°}$

$\frac{\sin 40}{8} = \frac{\sin 14}{c}$

$\boxed{c \approx 3.0}$

23. b = 10, c = 15, C = 66° 1 solution

$a \not> b$ $15 > 10$

$\frac{\sin 66}{15} = \frac{\sin B}{10}$

$10\sin 66 = 15\sin B$

$\sin B = .6090$

$\boxed{B \approx 38°}$

$180 - (66 + 38) = 76$

$\boxed{A \approx 76}$

$\frac{\sin 76}{a} = \frac{\sin 66}{15}$

$\boxed{a \approx 15.9}$

Determine whether each triangle should be solved by beginning with the Law of Sines or Law of Cosines. Then solve each triangle. Round measures of sides to the nearest tenth and measures of angles to the nearest degree.

24. C = 65°, a = 4, b = 7 cosines

$c^2 = 4^2 + 7^2 - 2(4)(7)\cos 65$

$\boxed{c = 6.4}$

$\frac{\sin 65}{6.4} = \frac{\sin A}{4}$

$4\sin 65 = 6.4\sin A$

$\boxed{A \approx 33°}$

$180 - (65 + 33) = 82$

$\boxed{B \approx 82°}$

25. A = 36°, a = 6, b = 8 sines

$\frac{\sin 36}{6} = \frac{\sin B}{8}$

$\boxed{B = 52°}$

$180 - (36 + 52) = 92$

$\boxed{C = 92}$

$\frac{\sin 36}{6} = \frac{\sin 92}{c}$

$\boxed{c \approx 10.2}$

26. b = 7.6, c = 14.1, A = 29° cosines

$a^2 = 7.6^2 + 14.1^2 - 2(7.6)(14.1)\cos 29$

$\boxed{a = 8.3}$

$\frac{\sin 29}{8.3} = \frac{\sin B}{7.6}$

$\boxed{B \approx 26°}$

$180 - (26 + 29) = 125$

$\boxed{C \approx 125°}$

Find the exact value of each function.

27. Sin (-150°)

$-150 + 360 = 210$

$\sin 210° = \boxed{-\frac{1}{2}}$

28. Cos 300°

$\frac{1}{2}$

29. (sin 45°)(sin 225°)

$\left(\frac{\sqrt{2}}{2}\right)\left(-\frac{\sqrt{2}}{2}\right) = -\frac{2}{4} = \boxed{-\frac{1}{2}}$

30. Sin $\frac{5\pi}{4}$

$\boxed{-\frac{\sqrt{2}}{2}}$

31. $(\sin 30°)^2 + (\cos 30°)^2$

$\left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{1}{4} + \frac{3}{4} = \boxed{1}$

32. $\frac{4\cos 150° + 2\sin 300°}{3}$

$\frac{4\left(-\frac{\sqrt{3}}{2}\right) + 2\left(-\frac{\sqrt{3}}{2}\right)}{3} = \boxed{-\sqrt{3}}$

$-\frac{4\sqrt{3}}{2} = -2\sqrt{3}$ $-\frac{2\sqrt{3}}{2} = -\sqrt{3}$